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A ROTARY POWER HAND TOOL HAVING
A FLEXIBLE HANDLE AND ATTACHMENT SYSTEM

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A ROTARY POWER HAND TOOL HAVING A FLEXIBLE HANDLE AND ATTACHMENT SYSTEM

FIELD OF THE INVENTION

The present invention is related to power hand tools. More particularly, the present invention is related to handles for power hand tools and a releasable attachment system for coupling the handles to the housing of the hand tool.

BACKGROUND OF THE INVENTION

Most power hand tools have handles of one form or another to facilitate their use. Exceptions to this may be found in power hand tools that are small enough for the user to conveniently hold them in one hand. When they are slightly larger, some power tools have handles that are detachable so that the user can choose whether a handle is convenient or not and either remove or attach it. The use of a handle may be desirable on power hand tools that are known in the building trade as spiral saws, i.e., cylindrical units that use a bit that closely resembles a drill bit, but which has cutting surfaces on the sides of the bit for cutting holes in dry wall for example. A detachable handle may be desirable for use with such spiral saws so that a user can comfortably hold the tool in different positions. Also, since such hand tools may require significant force to move it about during cutting of certain materials such as drywall. In those circumstances, two handed operation whereby the user directly grips the tool housing may be most convenient. It may be inconvenient, however, to grip the tool housing directly or to use two hands when using the tool to operate in other positions. When using the tool to cut into an overhead surface, for example, it may be useful to have a handle attached to the tool for gripping. The provision of a detachable

1 handle is advantageous in that a user may have the option of holding the tool
2 directly by its housing or by the handle.

3 It is also desirable for such detachable handles to be easily attached
4 and removed without the use of separate tools. At least one power rotary cutting
5 hand tool has a rigid handle that has an attachment mechanism that engages a pair
6 of recesses in the housing of the tool to firmly hold the tool and yet can be easily
7 removed. That structure is disclosed in U.S. Patent (Serial No. 10/161,944)
8 entitled POWER TOOL HANDLE and assigned to the Robert Bosch Tool
9 Corporation of Broadview Illinois. While artisans may prefer not to have a rigid
10 handle on the tool during some uses, it may be convenient and desirable to have a
11 flexible handle attached to the tool during some operations and/or for carrying the
12 tool between operations.

13 SUMMARY OF THE INVENTION

14 A preferred embodiment of the present invention is directed to a
15 rotary hand tool having a flexible handle and an attachment system associated with
16 the handle and the tool that enables easy attachment and removal of the flexible
17 handle. The system has housing attachment recesses on the tool that receive
18 attachment clips located at opposite end portions of the flexible handle. The
19 attachment recesses are compatible for attaching a generally C-shaped detachable
20 rigid handle which has opposite end portions with a gripping portion
21 therebetween. The rigid handle has a release lever in one end portion and a fixed
22 attachment arm on the other end portion for engaging the spaced apart attachment
23 recesses of the tool housing.

24 BRIEF DESCRIPTION OF THE DRAWINGS

25 FIGURE 1 is a perspective view of a preferred embodiment of a
26 power hand tool having a flexible handle attached thereto;

27 FIG. 2 is a plan view of the embodiment shown in FIG. 1;

1 FIG. 3 is a front view of an attachment clip of the flexible handle
2 shown in FIGS. 1 and 2;

3 FIG. 4 is a side view of the attachment clip shown in FIG. 3;

4 FIG. 5 is a side view of the embodiment shown in FIG. 1 and
5 particularly illustrating the attachment recesses thereof;

6 FIG. 6 is an enlarged view of one of the attachment recesses of the
7 embodiment shown in FIG. 5;

8 FIG. 7 is a cross-section taken generally along the line 7-7 in FIG. 6;

9 FIG. 8 is a cross-section taken generally along the line 8-8 of FIG. 6;

10 FIG. 9 is a plan view of the other of the attachment recesses shown
11 in FIG. 5;

12 FIG. 10 is a cross-section taken generally along the line 10-10 of
13 FIG. 9;

14 FIG. 11 is a cross-section taken generally along the line 11-11 of
15 FIG. 9; and

16 FIG. 12 is a side view of a rigid handle shown with portions
17 removed to illustrate the manner in which the rigid handle is attachable to the
18 power hand tool.

19 DETAILED DESCRIPTION

20 A preferred embodiment of the rotary power hand tool of the present
21 invention is shown in the drawings. While the preferred embodiment is shown in
22 connection with a rotary power hand tool that is generally cylindrical in overall
23 shape and is relatively small so that an artisan can operate the hand tool with one
24 or both hands without a handle or it may have a detachable rigid handle provided
25 with the tool. If the rigid handle is removed from the body of the tool, the user
26 must affirmatively grasp the body of the tool during use and while carrying it. If
27 there is no convenient place for an artisan to put the tool down between
28 operations, it may be convenient for the tool to have a flexible handle or longer

1 strap so that the user could use to easily hang the tool on his hand or arm at least
2 temporarily without consciously gripping the tool. The preferred embodiment of
3 the present invention facilitates various handle configurations so that the user can
4 choose between the various configurations as he sees fit.

5 Turning now to the drawings, and particularly FIGS. 1 and 2, a tool
6 indicated generally at 20, is shown to have a generally cylindrical elongated
7 housing 22 in which a motor is located. It has a rotatable output shaft 24 (see FIG.
8 5) to which a cutting bit 26 or other tool is attached. An adjustable depth guide 28
9 may be provided that fits on the nose of the tool for controlling the depth of cut of
10 the bit 26. A common use of this type of tool is to cut openings in drywall for
11 light fixtures, switch boxes and electrical outlets and the like with the bit 26 being
12 a spiral side cutting bit.

13 In accordance with the preferred embodiment of the present
14 invention, a flexible handle, indicated generally at 30, is provided and can be
15 attached to the housing at approximately the same locations as a rigid handle 32
16 shown in FIG. 12 can be attached. The rigid handle has a pivotable lever 34 at the
17 upper end thereof and an attachment arm 36 at the bottom end thereof. The
18 attachment arm 36 is curved downwardly to engage a flange in an attachment
19 recess, indicated generally at 38 in FIG. 5, and the lever 34 has a hook 40 that
20 engages a similar flange to be described that is located at an upper attachment
21 recess, indicated generally at 42 in FIG. 5. The lever 34 can be manipulated by
22 raising a cover 44 that reveals a thumb engaging surface (not shown) which when
23 depressed, causes the lever 34 to be moved upwardly to disengage from a shelf (to
24 be described later) enabling the handle 32 to be removed from the tool 20.

25 Returning to FIGS. 1 and 2, the flexible handle 30 comprises a long
26 thin strap 50 that is attached to attachment clips 52 on opposite end portions
27 thereof. The width of the strap 50 is approximately 3/4 of an inch, but can be
28 wider or narrower as desired. The strap is preferably made of a woven fabric that
29 is strong and durable and which preferably does not absorb moisture and may be

1 made of a synthetic material such as nylon or the like. Each of the attachment
2 clips 52 and 54 are substantially identical in construction and comprise split base
3 portions 56a and 56b so as to define a gap that facilitates removal of the clip from
4 the housing when desired. Each of the base portions 56a and 56b merge into a
5 generally transverse side portion 58 with a bridge portion 60 extending between
6 the side portions. A pair of spaced apart prongs 62 extend downwardly from the
7 base portion and each prong has a transverse leg 64, with the transverse legs
8 pointing away from each other and having a beveled surface 66 that tends to
9 deflect the prongs toward each other when the beveled surface 66 engage surfaces
10 of the housing when the attachment clips are inserted into the recesses 38 or 42.

11 While the bridge portion 60 is narrower than the side portions 58, it
12 has a sufficient cross sectional area so that it is relatively strong and provide the
13 necessary biasing force to keep the prongs 62 biased away from each other to
14 maintain engagement with complimentary structure of the recesses 38 and 42. In
15 this regard, the attachment clips are preferably formed as an integral one piece unit
16 and made of a resilient material that has sufficient strength to support the tool
17 when held by the strap 30 and sufficient strength to keep the prongs in locking
18 engagement with the housing.

19 One of the base segments, e.g., 56a, preferably has an L-shaped
20 extension 68 that limits the amount of movement of the sides 58 toward one
21 another when the user squeezes the sides together. To facilitate gripping, a
22 number of raised ribs 70 may be provided on the outer surface of each of the sides
23 58.

24 Referring again to FIGS. 1 and 2, the strap 50 includes a lower end
25 portion 72 that loops around the bridge portion 60 and the two layers of the strap
26 in this area are preferably sewn, riveted or otherwise attached together. At the
27 opposite end portion, the strap 50 extends through a buckle 74, is looped around
28 the bridge portion 60 of the clip 54 and extended back through the buckle 74 as
29 shown. The strap 50 may therefore be adjusted within the buckle 74 to vary the

1 effective length of the handle 30. The strap 50 also has a pad portion 76 secured
2 to it, with the strap 50 extending through an opening in a bottom portion 78 of the
3 pad 76.

4 Turning now to the upper attachment recess 42 and referring to
5 FIGS. 6, 7 and 8, the recess 42 has a bottom surface 80, as well as a number of
6 walls 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102 and 104, which extend from the
7 bottom surface 80 to the outer surface of the housing 22. While there are a
8 number of decorative bevels at the interface between the outer surface and the
9 walls, the walls are generally perpendicular to the plane of the bottom surface 80,
10 except for the surface 88, which as shown in FIG. 8, has a significant curvature.
11 As can be seen from the cross-sections of FIGS. 7 and 8, the walls 82, 94 and 100
12 have openings 106, 108 and 110 formed therein, respectively, which respectively
13 form shelves 112, 114 and 116 for engagement with the handles 30 or 32. In this
14 regard, walls 82 and 94 are spaced apart from one another and are opposed to each
15 other and are spaced a distance that is slightly less than the distance between the
16 prongs 62 of the attachment clips 52 so that the transverse legs 64 will engage the
17 shelves 112 and 114 to hold the clip 52 in place. If the flexible handle is removed
18 and the rigid handle 32 attached, the edge 40 of the lever 34 will engage the shelf
19 116 when it is attached to the housing 22.

20 With regard to the attachment recess 38, it is very similar in its
21 construction and the same reference numbers with a prime designation have been
22 given to similar features of it. It should be understood that the arm 36 of the rigid
23 handle 32 engages the shelf 106' when the rigid handle is attached to the tool 20.

24 While various embodiments of the present invention have been
25 shown and described, it should be understood that other modifications,
26 substitutions and alternatives are apparent to one of ordinary skill in the art. Such
27 modifications, substitutions and alternatives can be made without departing from
28 the spirit and scope of the invention, which should be determined from the
29 appended claims.

1 Various features of the invention are set forth in the following
2 claims.